Common physical and astronomical constants

Speed of light in a vacuum, c: $\qquad$ 3×10^8 m s^{-1}

Planck's constant, h: $\qquad$ 6.6×10^{-34} J s

Universal gravitational constant, G: $\qquad$ 6.7×10^{-11} N m^2 kg^{-2}

Permittivity of the vacuum, ϵ_o: $\qquad$ 8.8×10^{-12} F m^{-1}

Permeability of the vacuum, μ_o: $\qquad$ $4\pi \times 10^{-7}$ H m^{-1} (or N A^{-2})

Electron rest mass, m_e: $\qquad$ 9.1×10^{-31} kg

Proton rest mass, m_p: $\qquad$ 1.7×10^{-27} kg

Electron charge, e: $\qquad$ 1.6×10^{-19} C

Boltzmann's constant, k: $\qquad$ 1.4×10^{-23} J K^{-1}

Stefan's constant, σ: $\qquad$ 5.7×10^{-8} J m^{-2} s^{-1} K^{-4}

Avogadro's number, N_A: $\qquad$ 6.0×10^{23} mol^{-1}

Molar gas constant, R: $\qquad$ 8.3 J K^{-1} mol^{-1}

Volume occupied by 1 mole of gas at STP: $\qquad$ 22.4 litres

Mass density of water: $\qquad$ 1 kg litre^{-1}

(Note:

1 litre = 0.001 m^3)

Mass of the Sun, $M_\odot$: $\qquad$ 2×10^{30} kg

Radius of the Sun, $R_\odot$: $\qquad$ 7×10^8 m

Luminosity of the Sun, $L_\odot$ $\qquad$ 3.8×10^{26} W

Mass of the Earth, M_E: $\qquad$ 6×10^{24} kg

Radius of the Earth, R_E: $\qquad$ 6400 km

Mean radius of Earth's orbit around Sun: $\qquad$ 1.5×10^{11} m

Acceleration due to gravity on Earth's surface, g: $\qquad$ 9.8 m s^{-2}

Length of the tropical year: $\qquad$ 3.2×10^7 s